TRIBAL REVISIONS IN THE ASTERACEAE. VII.

THE RELATIONSHIP OF *ISOETOPSIS*.

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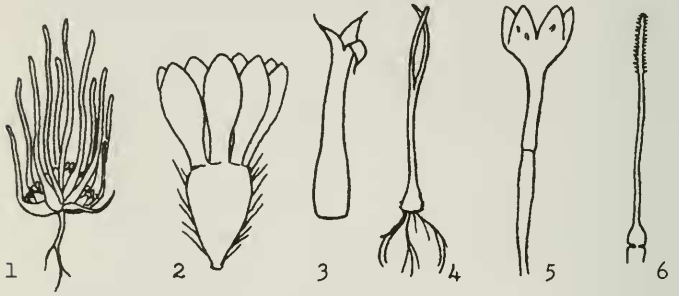
The small structurally reduced members of the family Asteraceae have quite naturally been subject to misinterpretation and misplacement. The examination of microscopic characters reveals many additional characters of such genera and indicates where many of them properly belong. A prime example of such a genus is the Australian *Isoetopsis* Turcz. which has been previously and consistantly placed in the Anthemideae. The consistancy of the misplacement of *Isoetopsis* is more because of lack of evidence. Even Bentham (1873) showed an unusual lack of conviction.

A survey of the Anthemideae for microscopic characters has shown all undoubted members of the tribe to have pollen with distinct internal columnar structure in the exine visible at high power of the compound microscope, to have truncate tips on the style branches, and to have markedly capitate short-stalked glands on the corolla. The genera placed in the Anthemideae that lack the pollen type differ also by one or more other important features. *Isoetopsis* differs from the Anthemideae in all three of the basic characters cited above, and there is evidence of a completely different relationship.

On dissection *Isoetopsis* shows a typical anther of the type found in the tribe Astereae. The exothecial cells tend to be elongate with thickenings on the lateral walls and the appendages are flat and narrow. The few slender glands on the lobes of the disk corollas are a type often found in the Astereae but are different from the large capitate glands of the Anthemideae or the glabrous condition of the Senecioneae. The phyllaries of *Isoetopsis* are similar to those of many Astereae with darker green tips but there are only about two series. The style branches of the disk flowers are nonfunctional but are nevertheless smooth on the short inner surfaces as in the Astereae. The pappus, which has been given surprisingly little notice in the literature, consists of a series of broad obovate squamae unlike anything in the Anthemideae or Senecioneae. Such a squamose pappus is more closely approached by those of some other members of the Astereae. The *Isoetopsis* pollen, while unlike that of the Anthemideae, agrees perfectly with that of a number of other tribes including the Astereae. There is no reason to doubt that *Isoetopsis* is a member of the Astereae.

The genus Isoetopsis seems to be rare in collections and in some cases even misrepresented. In the U.S. National Herbarium two of the three specimens under the name proved to be the genus Myriocephalus of the Inuleae. The following description of Isoetopsis is based on the third specimen having the following data. AUSTRALIA: A.C.T.: Black Mt., north slope, 700 m, stony ridge top in eucalypt forest; locally common but not widespread, McKee 11727.

Isoetopsis Turcz. Small sessile plants with linear leaves clustered on a very short erect base. Leaves 2.0-3.5 cm long with slightly expanded pale membraneous bases, lamina up to 1 mm wide, pale green, glabrous. Heads sessile among bases of leaves, ca. 4 mm high and 3 mm wide. Phyllaries in about 2 series, subequal, oblong-ovate, obtusely pointed, pale below and green



Figures 1-6. Isoetopsis graminifolia Turcz. 1. Habit. 2. Achene of ray flower. 3. Corolla of ray flower. 4. Style of ray flower. 5. Disk flower. 6. Style of disk flower.

toward tip, margins mostly narrowly pale to scarious. Ray flowers 5-6 pistillate with fertile achenes; corollas ca. 3 mm long, base somewhat enlarged, greenish and tubular above, usually 3-lobed, lobes short and narrowly triangular continuing into setiform tip of 2-3 parallel cells; style with complex basal structure (see below), appendages long and narrow, tapering with stigmatic line continuous along margin, inner surface flat and smooth, outer surface with scattered slight papillae; achenes obovate, densely covered with long slender setae having thick-walled cells, carpopodium a very narrow but distinct rim of about 3 rows of small quadrate cells; internal structure with numerous fibers (see below); pappus squamae ca. 8, obovate, obtusely acute with finely serrulate margin, somewhat thickened in middle with elongate cells more radiating above, cells at margin narrower and more regular, lower surface scabrous with projecting tips of cells. Disk flowers 2-3 with sterile achenes; corolla with long basal tube, throat slightly shorter than lobes and flaring, 4 lobes smooth on both surfaces with a few multi-

cellular elongate noncapitate glands externally; stamens 4, collars elongate with numerous quadrate to oblong cells having distinct nodular thickenings in walls, thecae not caudate, exothecial cells rather elongate with thickenings in lateral walls and with some unthickened transverse walls, appendages about as wide as collars, twice as long as wide and flat; style only slightly cleft apically, upper part with numerous elongate erect papillae on outer surfaces, without stigmatic lines, base of style bulbous and seated on small cylindrical nectary; achene very slender and elongate at maturity.

The most unique feature of the genus Isoetopsis is internal. Dissection of the ray achene shows an ovule surface of thin-walled rather quadrate cells that are notable in themselves for their dissimilarity to those of the Anthemideae. However, over the outer surface of these cells, between them and the wall of the achene are innumerable branching strands of fibers. These fibers nearly cover the inner surface of the achene wall and radiate outward and downward from the point of origin at the base of the style. This unique style of the ray flowers is gradually enlarged toward the base with no evident nectary. The fiberous outgrowths are all from the basal surface. The extreme lower lateral margin of the style base seems to be structurally fused and continuous with the base of the corolla.

Literature Cited

Bentham, G. 1873. Notes on the classification, history, and geographical distribution of Compositae. Jour. Linn. Soc. Bot. 13: 335-577. pl. 8-11.